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# TILL GEOCHEMISTRY OF TETAGOUCHE LAKES MAP AREA (21 O/9), NEW BRUNSWICK

by

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# TILL GEOCHEMISTRY OF
# TETAGOUCHE LAKES MAP AREA
# (21 O/9), NEW BRUNSWICK

## SAMPLING AND ANALYTICAL METHODS

During the summer of 1985, 265 till sites were sampled on a regularly spaced 2 km grid in the Tetagouche Lakes area (21 O/9). B-horizon and C-horizon samples were taken where possible and analyzed in several fractions (-80 mesh, -250 mesh, silt, clay). This preliminary geochemistry report contains data obtained from the clay fraction of the C-horizon, except those sites marked with an asterisk (*) where C-horizon samples could not be obtained and only B-horizon samples were then analyzed (Figure 1; Table 1). The B-horizon samples were analyzed in the -80 fraction because no clay was present.

The C-horizon clays were analyzed by Bondar Clegg Inc. for Pb, Zn, Cu, Ag, Ni, Mo, Cd, Co, Mn, Fe (all by atomic absorption), As (by colorimetry) and Sb (by X-ray fluorescence). The B-horizon samples were analyzed at the N. B. Mineral Resources Division Soils and Minerals laboratory in Fredericton for Pb, Zn, Cu, Ag, Ni, Co, Mn, Fe (all by atomic absorption) and Mo and Sb (by colorimetry). Sites with base metal and/or gold pathfinder anomalies were pan concentrated and analyzed for twenty-one elements by Becquerel Labs Inc. of Buffalo, New York. The analyses for the eight elements that constitute part of this study (Sb, As, Ba, Hf, La, Mo, Ta, and Au) are listed in Table 2. The analytical results for the following elements are available separately: Cd, Cr, Co, Ir, Fe, Ni, Se, Ag, Na, Th, W, U and Zn.

All sieving was done with an 8-inch sieve shaker; clay separation was done following the method developed and used by the Mineral Tracing Division of the Geological Survey of Canada.

The location grid for sample numbers in Tables 1 and 2 is incorporated with the surficial geology map of the area (Plate 86-216).

1. Plot 2 km regular grid
2. Dig sample pit into C-horizon (generally oxidized till)
3. Sample B- and C-horizon

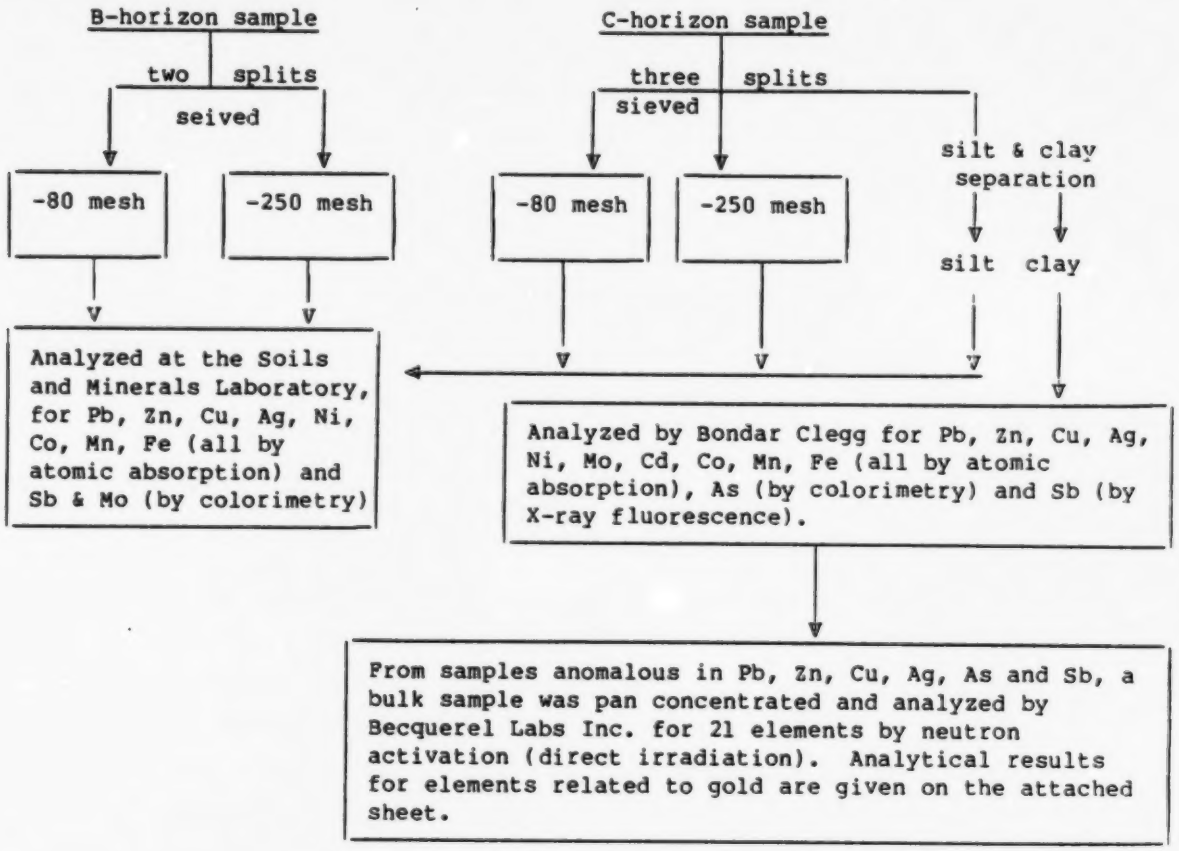
B-horizon sample
two splits
seived
-80 mesh
-250 mesh
C-horizon sample
three splits
sieved
-80 mesh
-250 mesh
silt & clay
separation
silt
clay
Analyzed at the Soils and Minerals Laboratory, for Pb, Zn, Cu, Ag, Ni, Co, Mn, Fe (all by atomic absorption) and Sb & Mo (by colorimetry)
Analyzed by Bondar Clegg for Pb, Zn, Cu, Ag, Ni, Mo, Cd, Co, Mn, Fe (all by atomic absorption), As (by colorimetry) and Sb (by X-ray fluorescence).
From samples anomalous in Pb, Zn, Cu, Ag, As and Sb, a bulk sample was pan concentrated and analyzed by Becquerel Labs Inc. for 21 elements by neutron activation (direct irradiation). Analytical results for elements related to gold are given on the attached sheet.

Figure 1. Flow chart of sampling procedure, and sample preparation and analysis.

TABLE 1
TILL GEOCHEMICAL ANALYSES
TETAGOUCHE LAKES MAP AREA (21 O/9)

| SAMPLE NUMBER | Mn | Fe | Co | Ni | Cu | Zn | Mo | Ag | Cd | Pb | As | Sb |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| A 1 | 480 | 3.4 | 12 | 42 | 9 | 85 | 1 | 0.1 | 0.2 | 20 | 10 | 1 |
| A 2* | 77 | 1.87 | 9 | 16 | 7 | 93 | 1 | 1.0 | - | 26 | - | 2 |
| A 3 | 165 | 3.2 | 8 | 39 | 19 | 80 | 1 | 0.2 | 0.2 | 38 | 12 | 1 |
| A 4 | 365 | 4.2 | 13 | 32 | 43 | 100 | 2 | 0.3 | 0.3 | 38 | IS | 1 |
| A 5 | 190 | 4.2 | 8 | 36 | 19 | 80 | 1 | 0.1 | 0.2 | 17 | 8 | 1 |
| A 6 | 500 | 5.0 | 15 | 59 | 28 | 118 | 2 | 0.1 | 0.2 | 15 | 12 | 1 |
| A 7 | 1800 | 2.9 | 12 | 45 | 17 | 80 | 15 | 0.3 | 0.2 | 26 | 10 | 1 |
| A 8 | 640 | 5.5 | 14 | 67 | 54 | 200 | 2 | 0.2 | 0.2 | 52 | 26 | 5 |
| A 9 | 390 | 5.7 | 11 | 45 | 62 | 190 | 2 | 0.2 | 0.2 | 56 | 29 | 1 |
| A10 | 900 | 19.0 | 10 | 69 | 90 | 390 | 2 | 0.3 | 0.3 | 50 | 656 | 1 |
| A11 | 880 | 5.5 | 18 | 64 | 52 | 90 | 2 | 0.1 | 0.2 | 30 | 12 | 1 |
| A12 | 400 | 5.0 | 15 | 52 | 70 | 91 | 2 | 0.1 | 0.2 | 19 | 25 | 1 |
| A13 | 1000 | 6.0 | 9 | 50 | 69 | 73 | 80 | 0.6 | 0.2 | 72 | 112 | 55 |
| A14 | 2000 | 5.9 | 19 | 68 | 60 | 181 | 4 | 0.2 | 0.2 | 91 | 78 | 3 |
| B 1 | 310 | 3.2 | 10 | 50 | 35 | 116 | 2 | 0.1 | 0.2 | 64 | 18 | 1 |
| B 2 | 400 | 3.1 | 11 | 38 | 35 | 102 | 3 | 0.4 | 0.3 | 54 | IS | 1 |
| B 3* | 417 | 4.12 | 20 | 16 | 20 | 82 | 2 | 1.7 | - | 22 | - | 4 |
| B 4 | 290 | 3.4 | 15 | 42 | 26 | 90 | 2 | 0.1 | 0.2 | 25 | 40 | 1 |
| B 5 | 670 | 4.5 | 13 | 52 | 17 | 100 | 1 | 0.1 | 0.2 | 15 | 26 | 1 |
| B 6 | 1250 | 6.9 | 16 | 43 | 57 | 268 | 4 | 0.3 | 0.3 | 70 | IS | 1 |
| B 7 | 260 | 1.9 | 5 | 16 | 485 | 920 | 1 | 0.2 | 0.2 | 11 | IS | 1 |
| B 8 | 640 | 6.4 | 14 | 47 | 41 | 200 | 1 | 0.2 | 0.2 | 57 | 38 | 2 |
| B 9 | 700 | 6.7 | 15 | 43 | 54 | 100 | 2 | 0.3 | 0.2 | 30 | 41 | 1 |
| B10 | 840 | 5.3 | 13 | 59 | 41 | 120 | 1 | 0.1 | 0.2 | 19 | 43 | 1 |
| B11 | 800 | 5.2 | 20 | 68 | 28 | 100 | 1 | 0.1 | 0.2 | 12 | 13 | 4 |
| B12 | 1000 | 4.8 | 23 | 80 | 121 | 96 | 1 | 0.1 | 0.2 | 10 | 17 | 1 |
| B13 | 322 | 3.96 | 16 | 16 | 19 | 108 | 2 | 1.0 | - | 27 | - | 4 |
| B14 | 700 | 5.0 | 23 | 60 | 74 | 300 | 3 | 0.3 | 0.2 | 42 | 60 | 1 |
| C 1 | 300 | 3.9 | 13 | 55 | 22 | 96 | 2 | 0.1 | 0.2 | 29 | 14 | 1 |
| C 2 | 180 | 4.0 | 5 | 31 | 21 | 124 | 3 | 0.3 | 0.3 | 51 | IS | 1 |
| C 3* | 192 | 2.23 | 11 | 9 | 10 | 35 | 1 | 1.8 | - | 36 | - | 2 |
| C 4 | 890 | 3.9 | 21 | 40 | 40 | 115 | 2 | 0.1 | 0.2 | 13 | 76 | 1 |
| C 5 | 810 | 4.6 | 16 | 74 | 39 | 100 | 1 | 0.1 | 0.2 | 23 | 20 | 1 |
| C 6 | 700 | 3.5 | 14 | 49 | 25 | 76 | 1 | 0.1 | 0.2 | 18 | 8 | 1 |
| C 7 | 1800 | 5.5 | 37 | 69 | 126 | 400 | 2 | 0.3 | 2.5 | 204 | 105 | 2 |
| C 8 | 486 | 4.0 | 14 | 63 | 54 | 94 | 1 | 0.3 | 0.2 | 41 | IS | 1 |
| C 9 | 1000 | 4.9 | 20 | 67 | 64 | 110 | 1 | 0.2 | 0.2 | 35 | 40 | 1 |
| C10 | 480 | 6.2 | 19 | 62 | 38 | 88 | 2 | 0.1 | 0.2 | 20 | 34 | 1 |
| C11 | 980 | 5.8 | 17 | 77 | 70 | 140 | 2 | 0.1 | 0.2 | 14 | 30 | 1 |
| C12 | 2400 | 5.8 | 36 | 132 | 155 | 138 | 4 | 0.3 | 0.2 | 50 | 81 | 1 |
| C13 | 330 | 7.2 | 5 | 26 | 126 | 510 | 3 | 1.4 | 0.2 | 483 | 324 | 15 |
| C14 | 430 | 5.8 | 13 | 43 | 55 | 260 | 5 | 0.3 | 0.2 | 58 | 75 | 1 |

*indicates samples obtained from the B-horizon only.
NOTE: All elements in ppm.
IS - insufficient sample

Table 1 continued

| SAMPLE NUMBER | Mn | Fe | Co | Ni | Cu | Zn | Mo | Ag | Cd | Pb | As | Sb |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| D 1 | 450 | 3.7 | 12 | 34 | 23 | 115 | 2 | 0.1 | 0.2 | 15 | 11 | 1 |
| D 2 | 190 | 2.9 | 6 | 30 | 42 | 115 | 4 | 0.1 | 0.2 | 34 | 18 | IS |
| D 3 | 300 | 2.7 | 11 | 45 | 20 | 164 | 1 | 0.2 | 0.2 | 18 | IS | 1 |
| D 4* | 885 | 3.64 | 21 | 18 | 16 | 97 | 2 | 1.4 | - | 34 | - | 4 |
| D 5 | 960 | 4.6 | 19 | 50 | 43 | 58 | 2 | 0.2 | 0.2 | 13 | 9 | 1 |
| D 6 | 740 | 3.6 | 19 | 59 | 39 | 80 | 1 | 0.1 | 0.2 | 12 | 20 | 1 |
| D 7 | 2200 | 9.2 | 23 | 193 | 92 | 60 | 20 | 0.2 | 0.2 | 30 | 136 | 3 |
| D 8 | 980 | 4.8 | 17 | 69 | 46 | 132 | 2 | 0.2 | 0.2 | 22 | 29 | 1 |
| D 9 | 980 | 5.0 | 16 | 65 | 49 | 130 | 2 | 0.2 | 0.2 | 16 | 26 | 1 |
| D10* | 757 | 7.18 | 33 | 28 | 38 | 77 | 2 | 1.4 | - | 19 | - | 4 |
| D11 | 1800 | 6.4 | 25 | 89 | 84 | 97 | 4 | 0.2 | 0.2 | 9 | 16 | 1 |
| D12* | 329 | 3.55 | 21 | 52 | 45 | 87 | 2 | 0.7 | - | 19 | - | 4 |
| D13 | 3100 | 6.6 | 22 | 88 | 89 | 230 | 5 | 0.3 | 0.2 | 25 | 55 | 1 |
| D14 | 480 | 5.7 | 15 | 42 | 57 | 260 | 5 | 0.2 | 0.2 | 62 | 59 | 1 |
| E 1 | 440 | 3.9 | 14 | 34 | 18 | 130 | 3 | 0.2 | 0.2 | 30 | IS | 1 |
| E 2 | 300 | 3.5 | 8 | 28 | 18 | 132 | 3 | 0.1 | 0.2 | 53 | IS | 1 |
| E 3 | 420 | 5.0 | 13 | 36 | 35 | 121 | 3 | 0.2 | 0.3 | 24 | IS | 1 |
| E 4 | 480 | 5.6 | 14 | 56 | 41 | 280 | 4 | 0.4 | 0.4 | 59 | 56 | 2 |
| E 5 | 400 | 5.8 | 5 | 55 | 28 | 80 | 2 | 0.2 | 0.2 | 23 | 18 | 1 |
| E 6 | 480 | 3.6 | 14 | 47 | 34 | 85 | 1 | 0.1 | 0.2 | 13 | 28 | 3 |
| E 7 | 760 | 5.5 | 13 | 74 | 62 | 130 | 3 | 0.2 | 0.2 | 31 | 98 | 3 |
| E 8 | 1000 | 5.7 | 13 | 64 | 61 | 136 | 1 | 0.2 | 0.2 | 35 | 82 | 3 |
| E 9 | 980 | 6.3 | 29 | 55 | 315 | 82 | 2 | 0.3 | 0.2 | 9 | IS | 3 |
| E10* | 594 | 6.60 | 27 | 18 | 36 | 76 | 2 | 1.4 | - | 19 | - | 2 |
| E11 | 2300 | 6.4 | 27 | 133 | 149 | 152 | 5 | 0.2 | 0.2 | 30 | 38 | 1 |
| E12 | 3800 | 8.2 | 42 | 47 | 65 | 120 | 2 | 0.1 | 0.2 | 10 | 13 | 3 |
| E13 | 1500 | 6.6 | 14 | 40 | 57 | 175 | 4 | 0.4 | 0.2 | 81 | 83 | 2 |
| E14 | 1034 | 7.5 | 19 | 41 | 69 | 308 | 4 | 0.4 | 0.3 | 68 | IS | 1 |
| F 1 | 940 | 3.4 | 18 | 36 | 23 | 110 | 3 | 0.2 | 0.2 | 53 | 20 | 3 |
| F 2 | 466 | 3.5 | 7 | 33 | 60 | 400 | 5 | 1.5 | 2.5 | 445 | IS | 1 |
| F 3 | 506 | 4.4 | 12 | 39 | 70 | 138 | 3 | 0.9 | 0.4 | 22 | IS | 1 |
| F 4 | 1300 | 5.2 | 19 | 63 | 56 | 160 | 2 | 0.2 | 0.2 | 27 | 133 | 5 |
| F 5 | 475 | 4.1 | 7 | 30 | 20 | 48 | 3 | 0.4 | 0.2 | 11 | IS | 1 |
| F 6 | 720 | 4.0 | 17 | 52 | 37 | 95 | 3 | 0.2 | 0.2 | 19 | 26 | 1 |
| F 7 | 1540 | 6.4 | 24 | 81 | 61 | 155 | 1 | 0.4 | 0.3 | 44 | 63 | 1 |
| F 8 | 1000 | 5.5 | 15 | 66 | 59 | 160 | 2 | 0.1 | 0.2 | 22 | 64 | 7 |
| F 9 | 1050 | 6.1 | 25 | 105 | 173 | 145 | 3 | 0.1 | 0.2 | 10 | 19 | 1 |
| F10 | 1300 | 5.7 | 19 | 79 | 66 | 120 | 5 | 0.1 | 0.2 | 16 | 27 | 1 |
| F11 | 1700 | 6.1 | 23 | 83 | 70 | 185 | 5 | 0.1 | 0.2 | 18 | 25 | 2 |
| F12 | 1200 | 4.6 | 16 | 45 | 40 | 118 | 5 | 0.1 | 0.2 | 32 | 62 | 1 |
| F13 | 1320 | 8.8 | 15 | 23 | 33 | 203 | 3 | 0.4 | 0.4 | 25 | IS | 1 |
| F14 | 380 | 3.4 | 9 | 25 | 156 | 261 | 4 | 0.3 | 0.2 | 19 | IS | 5 |

Table 1 continued

| SAMPLE NUMBER | Mn | Fe | Co | Ni | Cu | Zn | Mo | Ag | Cd | Pb | As | Sb |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| G 1 | 270 | 3.9 | 11 | 45 | 28 | 190 | 4 | 0.2 | 0.4 | 77 | 15 | 1 |
| G 2* | 150 | 3.30 | 11 | 29 | 9 | 76 | 2 | 1.0 | - | 19 | - | 4 |
| G 3 | 740 | 4.1 | 16 | 35 | 38 | 128 | 4 | 3.1 | 0.4 | 86 | 25 | 1 |
| G 4 | 820 | 5.0 | 16 | 56 | 44 | 165 | 3 | 0.1 | 0.2 | 34 | 23 | 1 |
| G 5 | 463 | 5.8 | 15 | 55 | 40 | 118 | 4 | 0.1 | 0.2 | 21 | IS | 1 |
| G 6 | 1200 | 4.2 | 25 | 71 | 162 | 270 | 4 | 0.1 | 1.2 | 39 | 14 | 1 |
| G 7 | 640 | 7.0 | 18 | 58 | 40 | 136 | 4 | 0.2 | 0.2 | 30 | IS | 3 |
| G 8 | 640 | 4.3 | 13 | 57 | 50 | 100 | 2 | 0.1 | 0.2 | 13 | 9 | 1 |
| G 9 | 1600 | 6.3 | 34 | 82 | 149 | 145 | 3 | 0.1 | 0.2 | 10 | 10 | 1 |
| G10 | 975 | 5.0 | 8 | 31 | 26 | 163 | 4 | 0.3 | 0.2 | 50 | IS | 1 |
| G11 | 980 | 6.6 | 18 | 42 | 61 | 90 | 5 | 0.3 | 0.2 | 45 | 41 | 1 |
| G12 | 1400 | 5.1 | 21 | 78 | 60 | 138 | 3 | 0.1 | 0.2 | 30 | 27 | 1 |
| G13 | 850 | 4.3 | 12 | 33 | 48 | 400 | 3 | 0.2 | 0.2 | 252 | 68 | 2 |
| G14 | 1000 | 5.3 | 19 | 42 | 55 | 123 | 5 | 0.1 | 0.2 | 58 | 44 | 1 |
| H 1 | 170 | 3.3 | 7 | 16 | 38 | 156 | 1 | 1.0 | 0.2 | 39 | 15 | 1 |
| H 2 | 510 | 3.9 | 13 | 35 | 14 | 310 | 2 | 0.2 | 1.5 | 147 | 13 | 4 |
| H 3 | 400 | 4.2 | 10 | 32 | 20 | 96 | 3 | 0.2 | 0.2 | 26 | 12 | 1 |
| H 4 | 1100 | 5.4 | 19 | 61 | 39 | 160 | 1 | 0.3 | 0.2 | 46 | 26 | 1 |
| H 5 | 800 | 4.8 | 20 | 69 | 51 | 100 | 1 | 0.1 | 0.2 | 18 | 22 | 1 |
| H 6* | 1027 | 4.15 | 17 | 22 | 15 | 99 | 1 | 1.3 | - | 23 | - | 2 |
| H 7 | 600 | 3.7 | 13 | 53 | 31 | 105 | 1 | 0.1 | 0.2 | 17 | 17 | 1 |
| H 8 | 1500 | 5.6 | 23 | 128 | 115 | 118 | 1 | 0.1 | 0.2 | 18 | 32 | 1 |
| H 9 | 1000 | 6.3 | 28 | 79 | 89 | 106 | 1 | 0.1 | 0.2 | 11 | 19 | 1 |
| H10 | 1000 | 5.3 | 21 | 85 | 92 | 110 | 1 | 0.1 | 0.2 | 19 | 35 | 2 |
| H11 | 1800 | 5.8 | 23 | 85 | 104 | 150 | 3 | 0.1 | 0.2 | 27 | 28 | 1 |
| H12 | 390 | 5.7 | 8 | 31 | 24 | 120 | 3 | 0.1 | 0.2 | 49 | 30 | 1 |
| H13 | 800 | 5.1 | 9 | 23 | 22 | 170 | 2 | 0.1 | 0.2 | 48 | 37 | 1 |
| H14 | 1450 | 5.5 | 20 | 48 | 61 | 180 | 3 | 0.1 | 0.2 | 68 | 66 | 1 |
| K 1* | 476 | 3.15 | 20 | 13 | 13 | 64 | 2 | 1.3 | - | 19 | - | 4 |
| K 2 | 490 | 4.6 | 12 | 42 | 33 | 96 | 2 | 0.3 | 0.2 | 52 | 34 | 1 |
| K 3 | 1000 | 5.6 | 19 | 50 | 33 | 120 | 3 | 0.2 | 0.2 | 26 | 59 | 1 |
| K 4 | 1200 | 4.9 | 19 | 71 | 52 | 115 | 2 | 0.1 | 0.2 | 18 | 17 | 3 |
| K 5 | 920 | 4.7 | 21 | 87 | 59 | 95 | 2 | 0.1 | 0.2 | 30 | 16 | 1 |
| K 6 | 830 | 5.3 | 17 | 79 | 76 | 106 | 2 | 0.2 | 0.2 | 24 | 9 | 1 |
| K 7 | 700 | 4.0 | 14 | 55 | 35 | 130 | 1 | 0.1 | 0.2 | 19 | 36 | 1 |
| K 8 | 780 | 5.0 | 19 | 113 | 63 | 105 | 1 | 0.1 | 0.2 | 12 | 18 | 1 |
| K 9 | 1800 | 8.0 | 26 | 49 | 103 | 150 | 2 | 0.2 | 0.2 | 8 | 13 | 1 |
| K10 | 1000 | 5.6 | 20 | 93 | 84 | 128 | 3 | 0.1 | 0.2 | 28 | 42 | 1 |
| K11 | 1050 | 5.4 | 15 | 28 | 32 | 110 | 3 | 0.3 | 0.2 | 56 | 31 | 1 |
| K12 | 660 | 3.8 | 12 | 53 | 37 | 147 | 2 | 0.1 | 0.2 | 53 | 34 | 1 |
| K13* | 207 | 3.46 | 11 | 14 | 11 | 77 | 1 | 1.0 | - | 42 | - | 4 |
| K14 | 800 | 4.5 | 12 | 35 | 39 | 220 | 3 | 0.2 | 0.2 | 76 | 39 | 1 |

Table 1 continued

| SAMPLE NUMBER | Mn | Fe | Co | Ni | Cu | Zn | Mo | Ag | Cd | Pb | As | Sb |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| L 1 | 740 | 7.2 | 13 | 32 | 29 | 100 | 3 | 0.1 | 0.2 | 14 | 20 | 1 |
| L 2 | 320 | 4.7 | 9 | 40 | 26 | 165 | 1 | 0.2 | 0.2 | 19 | 31 | 1 |
| L 3* | 604 | 3.26 | 17 | 22 | 19 | 97 | 2 | 1.3 | - | 23 | - | 4 |
| L 4 | 940 | 5.2 | 18 | 64 | 47 | 105 | 1 | 0.1 | 0.2 | 18 | 27 | 1 |
| L 5 | 900 | 5.2 | 23 | 89 | 49 | 110 | 1 | 0.2 | 0.2 | 19 | 24 | 1 |
| L 6 | 560 | 4.7 | 17 | 72 | 47 | 100 | 1 | 0.3 | 0.2 | 20 | 13 | 1 |
| L 7 | 970 | 3.2 | 13 | 58 | 29 | 90 | 1 | 0.2 | 0.2 | 19 | 9 | 1 |
| L 8 | 780 | 5.1 | 21 | 125 | 74 | 100 | 1 | 0.1 | 0.2 | 13 | 19 | 2 |
| L 9 | 1100 | 6.0 | 18 | 46 | 64 | 300 | 2 | 0.2 | 0.4 | 88 | 117 | 1 |
| L10 | 1600 | 5.9 | 20 | 123 | 104 | 140 | 1 | 0.2 | 0.2 | 34 | 42 | 1 |
| L11 | 800 | 5.2 | 17 | 46 | 42 | 145 | 1 | 0.3 | 0.2 | 80 | 48 | 1 |
| L12 | 860 | 5.5 | 10 | 41 | 32 | 120 | 2 | 0.2 | 0.2 | 61 | 33 | 1 |
| L13 | 1050 | 6.1 | 10 | 26 | 20 | 165 | 4 | 0.2 | 0.2 | 68 | 25 | 1 |
| L14 | 980 | 5.0 | 17 | 46 | 55 | 185 | 2 | 0.1 | 0.2 | 90 | 46 | 1 |
| M 2 | 940 | 5.0 | 16 | 80 | 44 | 125 | 1 | 0.1 | 0.2 | 36 | 22 | 1 |
| M 3* | 155 | 2.04 | 12 | 31 | 10 | 35 | 1 | 0.3 | - | 15 | - | 4 |
| M 4 | 520 | 5.4 | 12 | 57 | 30 | 100 | 2 | 0.1 | 0.2 | 26 | 21 | 1 |
| M 5 | 660 | 5.1 | 18 | 100 | 45 | 118 | 2 | 0.1 | 0.2 | 24 | 14 | 1 |
| M 6* | 241 | 3.32 | 14 | 37 | 46 | 44 | 2 | 0.3 | - | 11 | - | 2 |
| M 7 | 810 | 5.6 | 13 | 76 | 55 | 128 | 2 | 0.2 | 0.2 | 32 | 37 | 1 |
| M 8 | 1000 | 5.7 | 17 | 94 | 67 | 260 | 2 | 0.2 | 0.2 | 22 | 27 | 1 |
| M 9 | 1600 | 5.0 | 18 | 36 | 61 | 180 | 3 | 0.2 | 0.2 | 102 | 71 | 1 |
| M10 | 1550 | 6.0 | 27 | 102 | 98 | 120 | 3 | 0.1 | 0.2 | 19 | 22 | 1 |
| M11 | 970 | 6.0 | 15 | 48 | 39 | 210 | 3 | 0.1 | 0.2 | 57 | 26 | 1 |
| M12 | 1400 | 5.8 | 15 | 45 | 50 | 420 | 1 | 0.2 | 0.3 | 138 | 55 | 1 |
| M13 | 340 | 6.4 | 4 | 19 | 20 | 156 | 2 | 0.9 | 0.2 | 91 | 164 | 1 |
| M14 | 2000 | 5.9 | 26 | 32 | 60 | 155 | 6 | 0.1 | 0.2 | 61 | 35 | 1 |
| N 1 | 400 | 4.6 | 11 | 44 | 26 | 88 | 1 | 0.1 | 0.2 | 23 | 20 | 1 |
| N 2 | 160 | 3.2 | 9 | 56 | 28 | 80 | 1 | 0.2 | 0.2 | 13 | 4 | 1 |
| N 3 | 380 | 5.6 | 10 | 58 | 28 | 86 | 1 | 0.1 | 0.2 | 19 | 16 | 1 |
| N 4 | 940 | 5.3 | 17 | 89 | 44 | 140 | 1 | 0.1 | 0.2 | 23 | 16 | 1 |
| N 5 | 620 | 5.3 | 15 | 95 | 42 | 110 | 1 | 0.1 | 0.2 | 22 | 13 | 2 |
| N 6 | 780 | 5.7 | 16 | 70 | 80 | 120 | 4 | 0.2 | 0.2 | 34 | 32 | 1 |
| N 7 | 530 | 4.6 | 11 | 50 | 25 | 127 | 1 | 0.1 | 0.2 | 17 | 37 | 1 |
| N 8 | 1000 | 5.5 | 22 | 88 | 60 | 166 | 1 | 0.1 | 0.2 | 15 | 20 | 2 |
| N 9 | 980 | 4.8 | 15 | 50 | 44 | 140 | 1 | 0.2 | 0.2 | 53 | 56 | 6 |
| N10 | 700 | 5.2 | 11 | 32 | 25 | 122 | 2 | 0.2 | 0.2 | 30 | 27 | 1 |
| N11 | 940 | 5.4 | 14 | 41 | 32 | 155 | 1 | 0.1 | 0.2 | 90 | 39 | 1 |
| N12 | 1900 | 5.7 | 18 | 59 | 53 | 145 | 1 | 0.1 | 0.2 | 45 | 36 | 1 |
| N13 | 1000 | 4.9 | 16 | 37 | 32 | 156 | 2 | 0.2 | 0.4 | 74 | 45 | 1 |
| N14 | 3500 | 5.4 | 8 | 14 | 29 | 190 | 3 | 0.9 | 0.2 | 127 | 976 | 5 |

Table 1 continued

| SAMPLE NUMBER | Mn | Fe | Co | Ni | Cu | Zn | Mo | Ag | Cd | Pb | As | Sb |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| P 1 | 830 | 5.1 | 16 | 76 | 37 | 95 | 2 | 0.2 | 0.2 | 32 | 17 | 1 |
| P 2* | 149 | 2.57 | 9 | 11 | 8 | 32 | 2 | 0.6 | - | 11 | - | 4 |
| P 3 | 650 | 4.6 | 14 | 81 | 36 | 100 | 2 | 0.1 | 0.2 | 21 | 8 | 3 |
| P 4 | 460 | 4.5 | 17 | 98 | 54 | 115 | 2 | 0.2 | 0.2 | 24 | 13 | 1 |
| P 5 | 420 | 5.8 | 11 | 44 | 34 | 77 | 3 | 0.3 | 0.2 | 29 | 16 | 1 |
| P 6 | 2300 | 8.3 | 24 | 99 | 122 | 125 | 14 | 0.3 | 0.2 | 63 | 109 | 3 |
| P 7 | 490 | 4.4 | 14 | 60 | 32 | 135 | 1 | 0.1 | 0.2 | 18 | 26 | 1 |
| P 8 | 840 | 5.1 | 17 | 86 | 53 | 160 | 1 | 0.1 | 0.2 | 22 | 34 | 4 |
| P 9 | 4700 | 6.2 | 34 | 93 | 98 | 140 | 2 | 0.1 | 0.2 | 21 | 25 | 1 |
| P10 | 1700 | 5.5 | 23 | 76 | 56 | 210 | 1 | 0.3 | 0.3 | 55 | 30 | 1 |
| P11 | 1400 | 5.2 | 20 | 69 | 60 | 130 | 2 | 0.2 | 0.2 | 45 | 30 | 1 |
| P12 | 1600 | 6.3 | 21 | 76 | 75 | 150 | 3 | 0.1 | 0.2 | 37 | 27 | 1 |
| P13 | 980 | 4.9 | 13 | 45 | 59 | 195 | 3 | 0.1 | 0.2 | 86 | 48 | 1 |
| P14 | 980 | 5.1 | 14 | 36 | 41 | 150 | 3 | 0.3 | 0.2 | 106 | 80 | 1 |
| Q 1 | 320 | 5.8 | 13 | 52 | 28 | 140 | 4 | 0.3 | 0.2 | 23 | 16 | 1 |
| Q 2* | 188 | 3.10 | 18 | 37 | 21 | 83 | 1 | 1.0 | - | 19 | - | 4 |
| Q 3 | 1000 | 5.0 | 17 | 59 | 37 | 119 | 3 | 0.1 | 0.2 | 21 | 11 | 1 |
| Q 4 | 1300 | 6.8 | 21 | 95 | 43 | 127 | 2 | 0.1 | 0.2 | 23 | 12 | 1 |
| Q 5 | 880 | 6.8 | 13 | 58 | 28 | 176 | 2 | 0.1 | 0.2 | 27 | 23 | 1 |
| Q 6 | 1600 | 5.7 | 14 | 56 | 27 | 136 | 4 | 0.2 | 0.2 | 17 | 21 | 1 |
| Q 7 | 520 | 4.6 | 12 | 48 | 22 | 137 | 2 | 0.2 | 0.2 | 15 | 14 | 1 |
| Q 8 | 900 | 5.4 | 16 | 63 | 40 | 131 | 2 | 0.1 | 0.2 | 18 | 29 | 1 |
| Q 9 | 1250 | 7.0 | 15 | 28 | 37 | 240 | 3 | 0.3 | 0.2 | 52 | 35 | 1 |
| Q10 | 1450 | 6.8 | 25 | 71 | 57 | 157 | 2 | 0.2 | 0.2 | 51 | 31 | 1 |
| Q11 | 860 | 6.6 | 13 | 47 | 31 | 140 | 3 | 0.1 | 0.2 | 35 | 18 | 1 |
| Q12 | 1100 | 5.8 | 14 | 30 | 30 | 164 | 3 | 0.1 | 0.2 | 55 | 27 | 1 |
| Q13 | 360 | 5.6 | 10 | 21 | 21 | 92 | 4 | 0.1 | 0.2 | 44 | 26 | 1 |
| Q14 | 580 | 5.1 | 10 | 31 | 25 | 188 | 4 | 0.1 | 0.2 | 50 | 59 | 1 |
| R 1 | 560 | 4.8 | 12 | 69 | 23 | 158 | 1 | 0.1 | 0.2 | 18 | 4 | 1 |
| R 2* | 387 | 4.71 | 19 | 27 | 18 | 71 | 1 | 1.0 | - | 27 | - | 4 |
| R 3* | 661 | 4.59 | 24 | 40 | 16 | 92 | 1 | 1.0 | - | 19 | - | 4 |
| R 4 | 580 | 7.0 | 15 | 59 | 27 | 141 | 2 | 0.6 | 0.2 | 20 | 13 | 1 |
| R 5 | 980 | 6.0 | 19 | 82 | 40 | 140 | 1 | 0.2 | 0.2 | 23 | 8 | 1 |
| R 6 | 630 | 6.3 | 13 | 55 | 33 | 126 | 3 | 0.4 | 0.2 | 14 | 40 | 1 |
| R 7 | 1300 | 7.4 | 19 | 42 | 44 | 109 | 3 | 0.2 | 0.2 | 12 | 16 | 1 |
| R 8 | 700 | 5.0 | 17 | 65 | 38 | 231 | 2 | 0.1 | 0.2 | 23 | 27 | 1 |
| R 9 | 940 | 5.8 | 18 | 88 | 75 | 132 | 2 | 0.1 | 0.2 | 34 | 41 | 1 |
| R10 | 1900 | 6.0 | 18 | 72 | 62 | 132 | 2 | 0.1 | 0.2 | 36 | 37 | 1 |
| R11 | 1200 | 6.2 | 17 | 61 | 42 | 163 | 3 | 0.1 | 0.2 | 36 | 29 | 1 |
| R12 | 1400 | 7.0 | 19 | 67 | 62 | 150 | 4 | 0.1 | 0.2 | 39 | 30 | 1 |
| R13 | 840 | 5.7 | 15 | 36 | 43 | 148 | 3 | 0.1 | 0.2 | 75 | 83 | 1 |
| R14 | 1400 | 5.8 | 14 | 26 | 32 | 166 | 3 | 0.1 | 0.2 | 66 | 55 | 2 |

Table 1 continued

| SAMPLE NUMBER | Mn | Fe | Co | Ni | Cu | Zn | Mo | Ag | Cd | Pb | As | Sb |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| S 1 | 660 | 5.4 | 14 | 68 | 25 | 124 | 2 | 0.1 | 0.2 | 14 | 6 | 1 |
| S 2* | 236 | 2.59 | 15 | 30 | 11 | 61 | 2 | 0.6 | - | 15 | - | 4 |
| S 3 | 940 | 6.0 | 18 | 101 | 33 | 117 | 2 | 0.1 | 0.2 | 21 | 11 | 1 |
| S 4 | 900 | 6.6 | 20 | 86 | 42 | 138 | 2 | 0.1 | 0.2 | 27 | 13 | 1 |
| S 5 | 710 | 6.0 | 18 | 81 | 35 | 115 | 2 | 0.1 | 0.2 | 17 | 17 | 1 |
| S 6 | 400 | 5.0 | 15 | 68 | 27 | 86 | 3 | 0.1 | 0.2 | 15 | 11 | 1 |
| S 7 | 780 | 5.4 | 16 | 71 | 33 | 104 | 1 | 0.1 | 0.2 | 19 | 16 | 1 |
| S 8 | 500 | 5.0 | 14 | 56 | 36 | 204 | 1 | 0.2 | 0.2 | 46 | 40 | 3 |
| S 9 | 1300 | 6.0 | 24 | 85 | 64 | 159 | 3 | 0.2 | 0.2 | 36 | 34 | 1 |
| S10 | 520 | 5.5 | 13 | 36 | 37 | 86 | 5 | 0.1 | 0.2 | 48 | 27 | 1 |
| S11 | 580 | 5.0 | 9 | 23 | 24 | 109 | 3 | 0.2 | 0.2 | 46 | 36 | 1 |
| S12 | 1000 | 6.2 | 13 | 50 | 60 | 186 | 2 | 0.1 | 0.2 | 41 | 33 | 1 |
| S13* | 206 | 2.24 | 10 | 10 | 19 | 60 | 2 | 1.0 | - | 35 | - | 4 |
| S14 | 1600 | 6.0 | 16 | 35 | 18 | 126 | 4 | 0.1 | 0.2 | 41 | 42 | 1 |
| T 1 | 440 | 5.4 | 14 | 59 | 21 | 150 | 2 | 0.1 | 0.2 | 20 | 12 | 1 |
| T 2 | 670 | 5.8 | 18 | 81 | 37 | 107 | 2 | 0.1 | 0.2 | 22 | 9 | 1 |
| T 3 | 870 | 5.6 | 14 | 63 | 32 | 121 | 3 | 0.1 | 0.2 | 21 | 15 | 1 |
| T 4 | 820 | 6.3 | 20 | 86 | 54 | 127 | 1 | 0.1 | 0.2 | 25 | 16 | 1 |
| T 5 | 780 | 5.6 | 12 | 40 | 22 | 107 | 2 | 0.1 | 0.2 | 19 | 10 | 1 |
| T 6 | 480 | 5.4 | 14 | 48 | 26 | 137 | 3 | 0.1 | 0.2 | 23 | 25 | 2 |
| T 7 | 680 | 5.0 | 17 | 65 | 79 | 94 | 6 | 0.1 | 0.2 | 17 | 13 | 1 |
| T 8 | 1300 | 4.8 | 15 | 58 | 43 | 156 | 4 | 0.1 | 0.2 | 40 | 51 | 1 |
| T 9 | 840 | 6.2 | 18 | 75 | 50 | 149 | 3 | 0.1 | 0.2 | 27 | 46 | 3 |
| T10 | 1300 | 6.3 | 22 | 63 | 59 | 196 | 2 | 0.5 | 0.5 | 50 | 102 | 1 |
| T11 | 760 | 5.2 | 13 | 38 | 45 | 113 | 3 | 0.1 | 0.2 | 97 | 42 | 1 |
| T12 | 1100 | 6.0 | 17 | 46 | 44 | 135 | 4 | 0.1 | 0.2 | 51 | 45 | 1 |
| T13 | 1150 | 6.3 | 15 | 39 | 33 | 176 | 3 | 0.1 | 0.2 | 54 | 56 | 1 |
| T14 | 1200 | 5.8 | 16 | 46 | 52 | 205 | 3 | 0.1 | 0.2 | 54 | 48 | 4 |
| V 1 | 350 | 4.8 | 12 | 55 | 21 | 121 | 3 | 0.1 | 0.2 | 17 | 6 | 1 |
| V 2 | 860 | 6.1 | 14 | 62 | 33 | 149 | 2 | 0.1 | 0.2 | 19 | 11 | 1 |
| V 3 | 500 | 5.4 | 19 | 83 | 32 | 107 | 1 | 0.1 | 0.2 | 17 | 9 | 1 |
| V 4 | 670 | 5.8 | 19 | 89 | 41 | 105 | 2 | 0.1 | 0.2 | 26 | 13 | 1 |
| V 5 | 940 | 5.7 | 17 | 92 | 49 | 120 | 3 | 0.1 | 0.2 | 24 | 17 | 1 |
| V 6 | 980 | 7.0 | 18 | 68 | 58 | 129 | 2 | 0.1 | 0.2 | 34 | 62 | 1 |
| V 7 | 800 | 5.2 | 17 | 69 | 55 | 115 | 1 | 0.1 | 0.2 | 15 | 25 | 1 |
| V 8 | 2100 | 5.0 | 19 | 81 | 91 | 132 | 2 | 0.2 | 0.2 | 30 | 24 | 1 |
| V 9 | 1500 | 5.5 | 20 | 65 | 38 | 167 | 2 | 0.1 | 0.2 | 36 | 68 | 1 |
| V10 | 1900 | 3.8 | 9 | 32 | 19 | 134 | 2 | 0.1 | 0.5 | 25 | 13 | 1 |
| V11 | 1000 | 6.4 | 18 | 66 | 71 | 150 | 3 | 0.1 | 0.2 | 37 | 46 | 1 |
| V12 | 1050 | 6.0 | 15 | 41 | 47 | 173 | 2 | 0.1 | 0.2 | 46 | 38 | 1 |
| V13 | 920 | 5.5 | 12 | 49 | 40 | 131 | 2 | 0.1 | 0.2 | 34 | 29 | 1 |
| V14 | 1000 | 6.1 | 24 | 121 | 91 | 158 | 4 | 0.1 | 0.2 | 41 | 46 | 1 |

Table 1 continued

| SAMPLE NUMBER | Mn | Fe | Co | Ni | Cu | Zn | Mo | Ag | Cd | Pb | As | Sb |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| W 1 | 680 | 6.8 | 18 | 67 | 37 | 134 | 3 | 0.1 | 0.2 | 22 | 15 | 1 |
| W 2 | 1600 | 7.0 | 23 | 98 | 45 | 190 | 1 | 0.1 | 0.2 | 21 | 11 | 1 |
| W 3 | 780 | 5.3 | 7 | 22 | 17 | 133 | 2 | 0.1 | 0.3 | 28 | 9 | 1 |
| W 4 | 1100 | 5.6 | 19 | 85 | 41 | 110 | 2 | 0.1 | 0.2 | 27 | 14 | 1 |
| W 5 | 800 | 7.7 | 8 | 26 | 30 | 147 | 3 | 0.1 | 0.2 | 23 | 15 | 1 |
| W 6 | 740 | 7.1 | 8 | 29 | 26 | 190 | 2 | 0.1 | 0.3 | 24 | 18 | 1 |
| W 7 | 1150 | 6.1 | 21 | 70 | 64 | 136 | 3 | 0.1 | 0.3 | 25 | 32 | 1 |
| W 8 | 870 | 6.7 | 16 | 55 | 75 | 179 | 5 | 0.2 | 0.2 | 31 | 36 | 1 |
| W 9 | 730 | 5.0 | 16 | 60 | 59 | 98 | 2 | 0.1 | 0.2 | 38 | 47 | 1 |
| W10 | 12500 | 7.6 | 68 | 60 | 45 | 103 | 4 | 0.1 | 0.2 | 55 | 254 | 1 |
| W11 | 1400 | 7.0 | 29 | 118 | 103 | 137 | 3 | 0.1 | 0.2 | 34 | 47 | 1 |
| W12 | 1600 | 6.0 | 22 | 53 | 50 | 133 | 3 | 0.1 | 0.2 | 49 | 35 | 2 |
| W13 | 1100 | 5.6 | 17 | 51 | 52 | 154 | 2 | 0.1 | 0.2 | 53 | 37 | 1 |
| W14 | 1700 | 5.5 | 12 | 53 | 50 | 159 | 3 | 0.1 | 0.2 | 44 | 47 | 1 |

TABLE 2
SELECTED PAN-CONCENTRATED C-HORIZON SAMPLES
ANALYZED BY NEUTRON ACTIVATION (DIRECT IRRADIATION)

| SAMPLE | Sb | As | Ba | Hf | La | Mo | Ta | Au |
|---|---|---|---|---|---|---|---|---|
| A13 | 28.1 | 105 | 430 | 5 | 49 | 39 | 1.2 | 9.3 |
| B9 | 3 | 27 | 360 | 10 | 35 | -2 | 1.3 | -5 |
| B10 | 2.6 | 24 | 220 | 10 | 33 | -2 | -1 | 14.0 |
| C4 | 2.4 | 45 | 290 | 11 | 27 | -2 | 1.5 | 6.3 |
| C7 | 3 | 22 | 210 | 5.9 | 28 | -2 | -1 | -5 |
| C8 | 2.5 | 18 | 310 | 6.5 | 37 | -2 | 1.5 | -5 |
| C9 | 2.8 | 24 | 290 | 9.1 | 34 | -2 | -1 | 619.0 |
| C12 | 6.2 | 97 | 250 | 6.7 | 30 | -2 | 1.4 | -5 |
| C13 | 16.0 | 181 | 560 | 9.5 | 110 | -2 | 2.7 | 35.0 |
| D7 | 4.1 | 52 | 190 | 6.5 | 47 | 4.8 | -1 | -5 |
| D13 | 4.4 | 45 | 620 | 8.3 | 46 | -2 | 2.5 | -5 |
| E4 | 4.9 | 39 | 220 | 12.0 | 43 | -2 | 2.2 | -5 |
| E7 | 2.4 | 39 | 280 | 6.4 | 30 | -2 | 1.2 | -5 |
| E8 | 10.0 | 65 | 390 | 6.5 | 42 | -2 | 1.0 | -5 |
| E13 | 5.9 | 64 | 290 | 8.6 | 42 | -2 | 2.5 | -5 |
| F2 | 9.2 | 53 | 170 | 14.0 | 52 | -2 | 3.1 | 31.0 |
| F3 | 1.9 | 19 | 230 | 12.0 | 30 | -2 | 1.3 | -5 |
| F4 | 4.3 | 90 | 310 | 14.0 | 44 | -2 | 2.3 | -5 |
| F7 | 2.9 | 30 | 330 | 6.6 | 31 | -2 | 1.1 | -5 |
| F8 | 7.1 | 51 | 310 | 7.0 | 29 | -2 | 1.3 | 6.1 |
| G3 | 3.6 | 25 | 220 | 16.0 | 32 | -2 | 2.1 | -5 |
| G13 | 5.3 | 60 | 430 | 18.0 | 68 | -2 | 2.8 | -5 |
| H1 | 3.7 | 22 | 170 | 15.0 | 51 | -2 | 2.7 | -5 |
| H8 | 4.6 | 20 | -100 | 4.8 | 24 | -2 | 1.0 | -5 |
| H11 | 2.1 | 24 | 270 | 7.8 | 34 | -2 | 1.6 | -5 |
| H14 | 4.9 | 51 | 360 | 20.0 | 110 | -2 | 3.2 | -5 |
| K4 | 1.3 | 10 | 280 | 6.0 | 25 | -2 | 1.0 | -5 |
| K9 | 2.5 | 11 | 110 | 5.7 | 27 | -2 | 1.4 | -5 |
| K10 | 2.3 | 18 | 270 | 6.5 | 44 | -2 | 1.7 | -5 |
| L9 | 2.9 | 27 | 430 | 13.0 | 88 | -2 | 2.2 | -5 |
| M9 | 5.7 | 52 | 460 | 14.0 | 63 | -2 | 2.4 | -5 |
| M10 | 2.4 | 64 | 550 | 16.0 | 79 | -2 | 2.9 | -5 |
| N6 | 2.0 | 14 | 320 | 6.4 | 30 | -2 | -1 | -5 |
| N9 | 8.7 | 39 | 460 | 10.0 | 54 | -2 | 2.1 | -5 |
| N13 | 3.2 | 32 | 480 | 14.0 | 59 | -2 | 2.9 | -5 |
| N14 | 5.2 | 249 | 400 | 15.0 | 80 | -2 | 2.6 | -5 |
| P6 | 3.1 | 32 | 370 | 5.4 | 42 | 2.1 | 1.0 | 5.8 |
| P8 | 4.9 | 27 | 200 | 8.2 | 35 | -2 | 1.2 | -5 |
| P14 | 2.3 | 26 | 440 | 13.0 | 62 | -2 | 2.1 | -5 |
| R13 | 4.2 | 43 | 450 | 12.0 | 51 | -2 | 1.8 | 6.9 |
| S8 | 5.2 | 35 | 410 | 12.0 | 61 | -2 | 2.1 | -5 |
| S10 | 2.8 | 20 | 340 | 9.1 | 48 | -2 | 1.9 | -5 |
| T9 | 6.8 | 39 | 200 | 7.5 | 32 | -2 | 1.4 | 14.0 |
| T10 | 5.3 | 60 | 280 | 14.0 | 61 | -2 | 2.4 | -5 |
| V6 | 3.5 | 27 | 300 | 8.3 | 37 | -2 | 1.2 | 6.6 |
| V8 | 5.4 | 46 | 280 | 11.0 | 53 | -2 | 2.0 | -5 |
| V10 | 1.6 | 17 | 420 | 10.0 | 120 | -2 | 2.1 | -5 |
| W10 | 2.5 | 102 | 260 | 9.3 | 52 | -2 | 2.4 | -5 |

NOTE: All elements in ppm except Au (ppb)
A negative sign (-) indicates "less than"

MAPS NOT

FILMED

CARTES

OMISES